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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
O DELL, DAVID K	

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1625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/783,848	DE BRABANDER ET AL.	
	Examiner	Art Unit	
	David K. O'Dell	1625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3,6-12,14,17 and 23-28* is/are pending in the application.

4a) Of the above claim(s) *14,17 and 24-28* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3, 6-12, 23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *3,6-12,14,17 and 23-28* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. 9/18/07
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 3,6-12, 14, 17, 23-28 are pending are pending in the current application. Claims 14, 17, 24-28 are withdrawn from consideration and are drawn to a non-elected invention as per the requirement for restriction election. Claims 3, 6-12, 23 are under examination.

This application claims benefit of U.S. Provisional 60/448,851 filed on 02/20/2003. Claims 7-12, 23 are denied the right to priority of the provisional application. These claims are not supported by the disclosure of the provisional application.

Supplemental Action

2. The applicant's representative, Mr. Steve Reed, phoned the examiner on August 21, 2007, to point out the fact that the examiner improperly interpreted the previous restriction requirement, thus excluding claims that were previously grouped together (See attached interview summary). The examiner recognized this error and issued a three-way telephone restriction between compounds, methods of making the compounds, and methods of using said compounds. Mr. Reed elected by telephone the compound Group I, which was what the examiner had previously examined (see previous action). The examiner would like to apologize for this clear error and regret any inconvenience it may have caused the applicant or the applicant's representative The exact requirements of this restriction are reproduced below, followed by the action (which is the same action as previously presented):

Election/Restriction

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 3, 6-12, 23 drawn to compounds classified in class 549, subclass 381.

II. Claims 14, 17, 28 drawn to methods of treating or preventing cancer or inhibiting microtubule formation with compounds of Group I, classified in class 514, subclass various depending on species election. If this group is elected, a further election of a single disclosed "cancer" along with a single disclosed species of compound for the treatment of the cancer is required. Further restriction will be made based on the election.

III. Claims 24, 26, 27 drawn to a process for preparing the compounds of Group I.

The restriction requirement is proper for the reasons listed below:

Inventions I is related to Inventions II and III, as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case, the process can be practiced with a materially different product. For example, paclitaxel alone may be used to treat cancer, by inhibiting microtubule formation.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate

status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise include all the limitations of the allowable product claim will be rejoined in accordance with the provisions of MPEP §821.041 Process claims that depend from or otherwise include all the limitations of the patentable product will be entered as a matter of right if the amendment is presented prior to final rejection or allowance, whichever is earlier. Amendments submitted after final rejection are governed by 37 CFR 1.116; amendments submitted after allowance are governed by 37 CFR 1.312. In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). See "Guidance on Treatment of Product and Process Claims in light of In re Ochiai; In re Brouwer and 35 U.S.C. §103(b)," 1184 O.G. 86 (March 26, 1996). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder**. Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

Response to Applicant's Remarks

3. Applicant's arguments with respect to claims 6-12, and 23 the reply filed on May 18, 2007 is acknowledged, and have been considered. Claim 1, has been canceled thus all rejections of claim 1 are withdrawn. The applicant has argued with respect to claim 23 under rejection under 35 U.S.C. 102(b) that "The inclusion of claim 23 in this ground for rejection is in error. Inasmuch as either cited publication teaches any compound, it is only peloruside A, which claim 23 does not encompass. Therefore, the cited publications do not anticipate claim 23. " The applicant is correct since Peloruside A requires that in structure 65D of claim 23 R_4 be H and the claim limits the identity of R_4 to "alkyl and functionalized alkyl". These arguments are moot in view of the new ground(s) of rejection. Claim 3 stands allowed, however claim 6-12, 23 are rejected under new grounds as delineated below (*vide infra*). This action is non-final.

Claim Rejections – 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

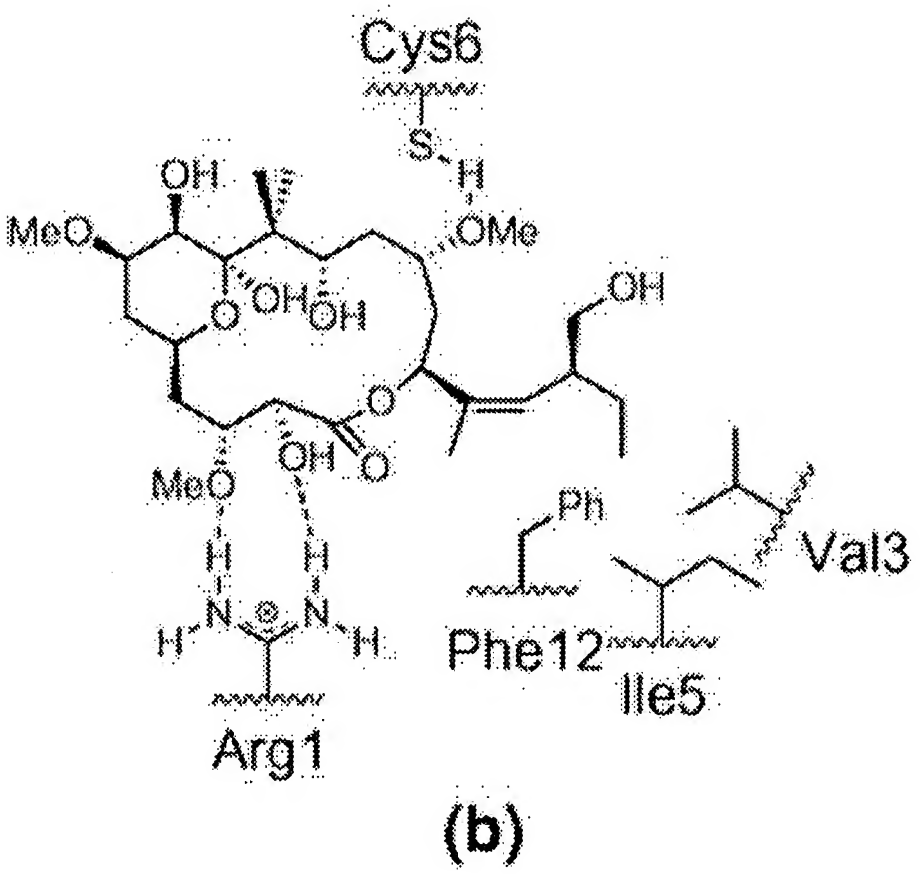
4. Claim 6 is rejected under 35 U.S.C. 101 because the claimed invention is not supported by either an asserted utility or a well established utility. Claim 6 is drawn to a compound that is a synthetic dead end, i.e. it cannot be converted to Peloruside A. The applicant considers these compounds Peloruside A analogs with the statement on pg. "The synthesis of **29** provides an example of Peloruside spiroacetal analogs, i.e. Peloruside macrocycles that have the C9 and C 11 hydroxyl groups incorporated into an

acetal ring, and can be prepared according to the general outline of Scheme 8. **Note that enantiomeric 29, i.e. ent-29, and analogs will be biologically active**." While it is very clear that compound 29 cannot be converted to Peloruside A, it is also clear that such compounds would not function in the same manner as Peloruside A (*vide infra* for a detailed discussion under the enablement rejection). While some showing of biological activity is sufficient to meet the utility requirement see (Nelson v. Bowler, 626 F.2d 853, 856, 206 USPQ 881, 883 (CCPA 1980) where testing was conducted), prophetic statements regarding synthetic intermediates that are significantly different from the natural product in chemical structure do not meet the requirements of 35 U. S.C. 101. See MPEP 2107.01 "....cases where only a generalized "nebulous" expression, such as "biological properties," had been disclosed in a specification. Such statements, the court held, "convey little explicit indication regarding the utility of a compound." Cross, 753 F.2d at 1048, 224 USPQ at 745 (citing In re Kirk, 376 F.2d 936, 941, 153 USPQ 48, 52 (CCPA 1967)). In Brana, the court pointed out that the purpose of treating cancer with chemical compounds does not suggest, per se, an incredible utility. Where the prior art disclosed "structurally similar compounds to those claimed by applicants which have been proven in vivo to be effective as chemotherapeutic agents against various tumor models . . ., one skilled in the art would be without basis to reasonably doubt applicants' asserted utility on its face." 51 F.3d at 1566, 34 USPQ2d at 1441. The examiner has a basis to reasonably doubt that the compounds are active. Since no analogs of Peloruside A have been tested an analysis of the speculative biological activity of these compounds seems appropriate. The mechanism of action of Peloruside A is binding to tubulin at an unknown site, however the theoretical binding site(s) have been modeled and the

conformation of the molecule is critical. See Jimenez-Barbero, J. et. al. " NMR Determination of the Bioactive Conformation of Peloruside A Bound To Microtubules" *Journal of the American Chemical Society* **2006**, 128, 8757-8765, conclusions pg. 8763.

Nevertheless, despite the large size of the macrocyclic ring, intramolecular interactions within the Peloruside A ring strongly affects the conformational features of this molecule, which indeed only shows conformational mobility around a fairly narrow part of the molecule. Specifically, van der Waals contacts and torsional constraints strongly bias its conformational behavior. Yet, this existing conformational freedom, in the presence of a given solvent, serves to modulate the presentation of polar and nonpolar surfaces to interact with the binding site. **Indeed, according to our experimental data, only one of the two major conformations existing in the water solution is bound to microtubules,** distinct from that predominantly present in nonpolar (chloroform) solvents. A model of the binding mode to tubulin has also been proposed, which involves the α-tubulin monomer, in contrast with taxol, which binds to the β-monomer.

Another author has proposed the following model for the interaction of Peloruside A with tubilin. Pineda, O. et. al. "Computational comparison of microtubule-stabilising agents laulimalide and peloruside with taxol and colchicines" *Bioorganic & Medicinal Chemistry Letters* **2004**, 4825–4829.



(b)

Thus the conformation of these molecules is critical for activity and in the instant case the compounds of claim 6 have a acetal (R16) that effectively removes two OH groups and conformationally restricts the ring of Peloruside. This is a drastic change in the conformational sense which is deemed critical by Jiminez-Barbero et. al. for the molecule to interact with tubulin.

As Per MPEP:

MPEP 2173.03

> **II. STRUCTURAL SIMILARITY TO COMPOUNDS WITH ESTABLISHED UTILITY**
>
> Courts have routinely found evidence of structural similarity to a compound known to have a particular therapeutic or pharmacological utility as being supportive of an assertion of therapeutic utility for a new compound. In In re Jolles, 628 F.2d 1322, 206 USPQ 885 (CCPA 1980), the claimed compounds were found to have utility based on a finding of a close structural relationship to daunorubicin and doxorubicin and shared pharmacological activity with those compounds, both of which were known to be useful in cancer chemotherapy. **The evidence of close structural similarity with the known compounds was presented in conjunction with evidence demonstrating substantial activity of the claimed compounds in animals customarily employed for screening anticancer agents. Such evidence should be given appropriate weight in determining whether one skilled in the art would find the asserted utility credible. Office personnel should evaluate not only the existence of the structural relationship, but also the reasoning used by the applicant or a declarant to explain why that structural similarity is believed to be relevant to the applicant's assertion of utility.**

Compare the compound of claim 3 (Formula III) which is essentially MOM protected Peloruside A (aka LX-3111), where no such conformational constraint would be expected. Indeed for this compound (aka LX-3136) data is presented to confirm that indeed this compound has the desired activity, thus the utility requirement is easily met for this compound Where is the reasoning or data to support the utility of the compounds of claim 6? The compound of claim 3 is clearly capable of being converted to Peloruside A also a legitimate utility (since Peloruside A has utility), however compound VI is not as per Liao et. al. "Total Synthesis and Absolute Configuration of the Novel Microtubule-Stabilizing Agent Peloruside A" *Angewandte Chemie International Edition* **2003**, *42*, 1648-1652. "Various attempts to remove the (2-naphthyl)methylidene acetal [the compound of claim 6] failed. Undeterred, we embraced the opportunity to explore a more attractive avenue that would eliminate this protecting group problem altogether, that is,

we decided to advance materials with a free C11 alcohol through the remainder of the synthesis."

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 4-12, & 23 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for certain compounds, does not reasonably provide enablement for the protracted list of compounds bearing the protracted list of substituents. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue." These factors include, but are not limited to the following:

(A) The breadth of the claims;
(B) The nature of the invention;
(C) The state of the prior art;
(D) The level of one of ordinary skill;
(E) The level of predictability in the art;
(F) The amount of direction provided by the inventor;
(G) The existence of working examples; and
(H) The quantity of experimentation needed to make or use the invention

In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

(A) The breadth of the claims: The claims are very broad encompassing a variety of heterocycles, bearing multiple substitutions **(B) The nature of the invention:** This is a chemical invention requiring the synthesis of compounds. **(D) The level of one of**

ordinary skill: One of ordinary skill is a practicing organic chemist. **(C) The state of the prior art:** Little prior art exists on these complex compounds, however the synthesis will be evaluated on what is known using scientific principles. **(E) The level of predictability in the art:** Chemistry is unpredictable. See In Re Marzocchi and Horton 169 USPQ at 367 paragraph 3. As stated in the preface to a recent treatise:

> "Most non-chemists would probably be horrified if they were to learn how many attempted syntheses fail, and how inefficient research chemists are. The ratio of successful to unsuccessful chemical experiments in a normal research laboratory is far below unity, and synthetic research chemists, in the same way as most scientists, spend most of their time working out what went wrong, and why. Despite the many pitfalls lurking in organic synthesis, most organic chemistry textbooks and research articles do give the impression that organic reactions just proceed smoothly and that the total synthesis of complex natural products, for instance, is maybe a labor-intensive but otherwise undemanding task. In fact, most syntheses of structurally complex natural products are the result of several years of hard work by a team of chemists, with almost every step requiring careful optimization. The final synthesis usually looks quite different from that originally planned, because of unexpected difficulties encountered in the initially chosen synthetic sequence. Only the seasoned practitioner who has experienced for himself the many failures and frustrations which the development (sometimes even the repetition) of a synthesis usually implies will be able to appraise such work.....Chemists tend not to publish negative results, because these are, as opposed to positive results, never definite (and far too copious)....." Dorwald F. A.

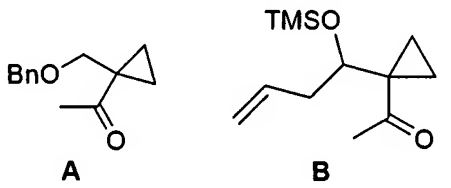
Side Reactions in Organic Synthesis, 2005, Wiley: VCH, Weinheim pg. IX of Preface.

(F) The amount of direction provided by the inventor, (G) The existence of working examples, and (H) The quantity of experimentation needed to make or use the invention: The examiner will first consider the cyclopropyl compounds of claim 9, 10, 11, 12, & 23 (i.e. 65 A, C, E, G, I structures) and discuss the limitations inherent to unavailability of starting materials,

As per MPEP:

> A key issue that can arise when determining whether the specification is enabling is whether the starting materials or apparatus necessary to make the invention are available. In the biotechnical area, this is often true when the product or process requires a particular strain of microorganism and when the microorganism is available only after extensive screening. The Court in In re Ghiron, 442 F.2d 985, 991, 169 USPQ 723, 727 (CCPA 1971), made clear that if the practice of a method requires a particular apparatus, the application must provide a sufficient disclosure of the apparatus if the apparatus is not readily available. The same can be said if certain chemicals are required to make a compound or practice a chemical process. In re Howarth, 654 F.2d 103, 105, 210 USPQ 689, 691 (CCPA 1981).

These are clearly prophetic compounds as no examples of these compounds can be found in the experimental procedures of the specification. In order for the prophetic schemes in figure 85-87 to be functional the required cyclopropyl compounds **A** and **B** must be available (Figure 1).



A B

Figure 1. Prophetic Cyclopropane compounds of Figure 85, 86 and 87.

A search for these materials using the commercial STN database reveals that no such compounds are known! According to the U.S. Court of Customs and Patent Appeals in *In re Argoudelis, De Boer, Eble, and Herr* 168 USPQ 99 at 101, "[o]rdinarily no problem in this regard arises since the method of preparing almost all starting materials can be set forth in writing if the materials are not already known and available to the workers in the art, and when this is done the specification is enabling to the public". *In re Argoudelis, De Boer, Eble, and Herr* 168 USPQ 99 at 104, "it is essential that there be no question that, *at the time an application for patent is filed,* (emphasis in original) the invention claimed therein is fully capable of being reduced to practice (i.e., that no technological problems, the resolution of which would require more than ordinary skill and reasonable time, remain in order to obtain an operative, useful embodiment)." That is not the situation here. Rather we find very little direction as to how the many required staring materials of formula **A** or the **B** are to be obtained. Where may the directions to prepare or buy them be found?

In re Howarth, 210 USPQ 689, (claimed derivatives of clavulanic acid not enabled by specification lacking information of how prepare the clavulanic acid or directions to reference materials containing such information), *Ex parte Schwarze* 151 USPQ 426 (where starting material is not known to art as of date of filing application, there must be included a description of preparation thereof to enable one skilled in this art

to carry out applicant's invention), *Ex parte Moersch* 104 USPQ 122 (claims to process for the production of (1)-y1-p-nitrophenyl-2-dichloracetamindo-propane-1,3-diol not enabled because of failure to describe source or method of obtaining starting compound; although starting compound is identified by means of appropriate name and by structural formula).

Certain limitations of the chemistry used to prepare the examples, and the proposed prophetic examples is readily apparent. Claims 7-12, 23 have claims drawn to Peloruside compounds that lack the OR_4 or OR_6 moiety of structure 65D, claim 23, these are compounds like the olefin 65F & 65 E and the alkane 65G. However it is very clear that simply plugging in what are the analogous starting materials into the synthesis of Peloruside (which is the only example of the instant case) will not allow for their preparation. The prophetic reaction scheme of Figure 90 is illustrative of this clear failure. The olefin of compound 61F will be dihydroxylated and subsequently cleaved when treated with the conditions of s-v.

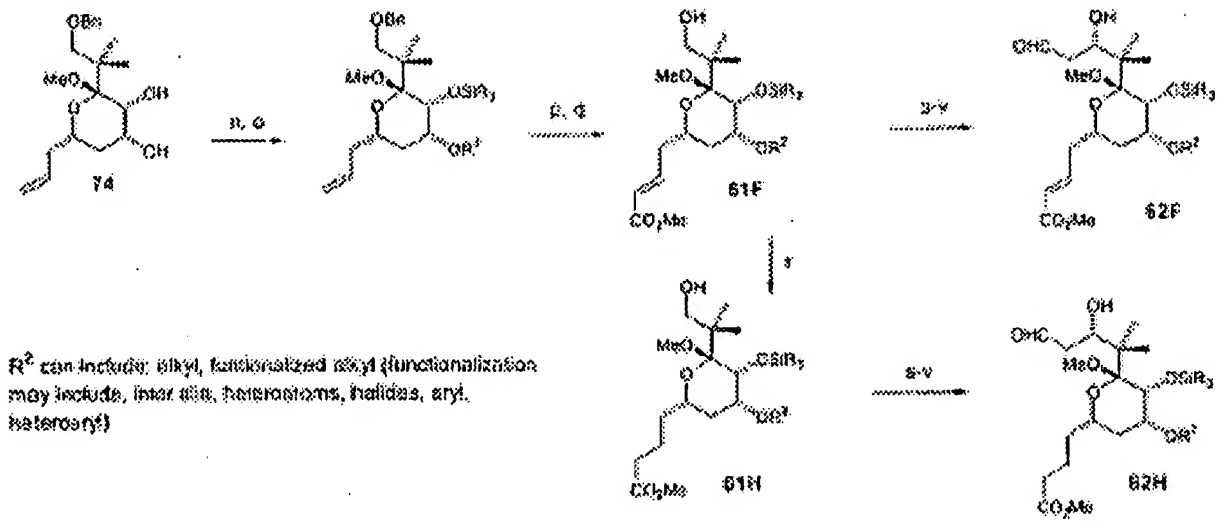


Figure 90

A more disturbing feature of the instant claims is the inclusion of a laundry list of Groups for R8, since R8 necessarily depends on the aldol reaction of ketones analogous to **6** with compound **23** in a key , however none of these reactions have been performed. Taking a closer look at the published account of this synthesis Liao et. al. "Total Synthesis and Absolute Configuration of the Novel Microtubule-Stabilizing Agent Peloruside A" *Angewandte Chemie International Edition* **2003**, *42*, 1648-1652, and comparing it side by side to the disclosure (shown on the next page) it is clear that prophetic synthesis or paper chemistry is far from straightforward and highly unpredictable.

Application Text

Peloruside analogs.

[0077] An example for the synthesis of analogs with C9-C 11 hydroxyls protected as a cyclic acetal is provided below. The biologically active forms of these analogs will have an enantiomeric relationship to the ones drawn in the schemes below. Union of fragments 6 and 25 and completion of a Peloruside analog is shown in Scheme 8 below. *Mukayama-type aldol reaction of aldehyde 25 with the enolsilane derived from methyl ketone 6 (BF3"Et20, CH2C12, -78°C) afforded almost exclusively (14:1) the 1,3-syn aldol product. This stereochemical outcome is contrary to the outcome expected from extensive literature precedents. Evidence provided below however, indicates that aldehyde 25 entered this reaction with an unprecedented bias for the formation of the 1,3-syn fl-hydroxy ketone 26 (80% yield). Hydroxy ketone 26 was protected as C13 methyl ether 27, followed by CBS reduction (and ester hydrolysis to reach seco-acid 28. Slow addition of this compound to a premixed solution of PPh3 and diisopropylazodicarboxylate* instigated formation of macrolactone 29 in 40-50% yield. *The stereochemistry of 29 was deduced based on a series of NOE correlations that locate H11, H13 and H15 on the same upper side of the macrolactone ring in agreement with the assigned C 13(S) configuration.* The synthesis of 29 provides an example of Peloruside spiroacetal analogs, i.e. Peloruside macrocycles that have the C9 and C 11 hydroxyl groups incorporated into an acetal ring, and can be prepared according to the general outline of Scheme 8. Note that enantiomeric 29, i.e. ent-29, and analogs will be biologically active.

Liao et. al.

With fragments 6 and 25 (derived from 24 as shown) at hand, **their union and completion of the peloruside macrocycle seemed an attainable goal, yet unexpected surprises lay ahead (Scheme 4).** *Mukaiyama-type aldol reaction of aldehyde 25 with the enol silane derived from methyl ketone 6 afforded almost exclusively (14:1) the compound that was assumed to be the expected 1,3-anti aldol product based on extensive literature precedent.[15] Evidence provided below, however, indicates that aldehyde 25 entered this reaction with an unprecedented bias for the formation of the 1,3-syn bhydroxy ketone 26 instead (80% yield). Initially unaware of this stereochemical outcome, we continued with methyl ether formation (!27), CBS reduction,[16] and ester hydrolysis to reach seco-acid 28. Slow addition of this compound to a premixed solution of PPh3 and diisopropylazodicarboxylate instigated formation of macrolactone 29 in 40–50% yield.[17]* We were able to deduce *the stereochemistry of 29 based on a series of NOE correlations that locate H11, H13, and H15 on the same upper side of the macrolactone ring in agreement with the assigned C13(S) configuration* (Figure 1). At this point, we were left with the obvious challenge of correcting the stereochemistry at C13. **Various attempts to remove the (2-naphthyl)methylidene acetal failed.[18] Undeterred, we embraced the opportunity to explore a more attractive avenue that would eliminate this protecting group problem altogether, that is, we decided to advance materials with a free C11 alcohol through the remainder of the synthesis.**

While the synthesis is one aspect, in this case these compounds bear no structural resemblance to one another when the acetals and "functionalized compounds are considered" and even if they did the situation is far from clear that they would have the desired activity. As one reviewer stated, Martin, Yvonne C. et. al. "Do Structurally Similar Molecules Have Similar Biological Activity?" *Journal of Medicinal Chemistry* **2002**, *45*, 4350-4358:

> "..... compounds that look very similar to a chemist sometimes bind in very different orientations in the protein active site, bind to a different conformation of a protein, or bind to a different protein altogether.[15] In fact, such observations are why medicinal chemists need to make so many compounds to optimize the biological activity of a structural class, even when they are designing to a biological target of known structure...(pg. 4536 column 2, line 9).....This work also shows that the biological similarity is not so strong as has previously been assumed. For example, at ≥ 0.85 Tanimoto similarity in Daylight fingerprints, **only 30% of compounds similar to an active are themselves active**."(conclusions)

In this instance we have no working examples and as stated by Jimenez-Barbero, J. et. al. " NMR Determination of the Bioactive Conformation of Peloruside A Bound To Microtubules" *Journal of the American Chemical Society* **2006**, 128, 8757-8765, conclusions pg. 8763 :

Nevertheless, despite the large size of the macrocyclic ring, intramolecular interactions within the Peloruside A ring strongly affects the conformational features of this molecule, which indeed only shows conformational mobility around a fairly narrow part of the molecule. **Specifically, van der Waals contacts and torsional constraints strongly bias its conformational behavior.** Yet, this existing conformational freedom, in thepresence of a given solvent, serves to modulate the presentation of polar and nonpolar surfaces to interact with the binding site. **Indeed, according to our experimental data, only one of the two major conformations existing in the water solution is bound to microtubules,** distinct from that predominantly present in nonpolar (chloroform) solvents. A model of the binding mode to tubulin has also been proposed, which involves the α-tubulin monomer, in contrast with taxol, which binds to the β-monomer.

I think no one would argue that the laundry list of "functionalized" compounds and "heteroaryls" would have the same activity. The factors outlined in *In Re Wands* mentioned above apply here, and in particular As per the MPEP 2164.01 (a):

"A conclusion of lack of enablement means that, based on the evidence regarding each of the above factors, the specification , at the time the application was filed, would not have taught one skilled in the art how to make and/or use the full scope of the claimed invention without undue experimentation. In re Wright 999 F.2d 1557,1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993)." It is very clear that one could not make/use this very broad invention that has no working examples in this unpredictable art without undue experimentation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 6-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "functionalized alkenyl" etc. is indefinite. Unless one knows what a substituent is a determination of what these compounds are cannot be made. The specification does not fully elaborate the identity of these substituents. This rejection is not being made for breadth, but for an inability to ascertain what this functionalization is.

Conclusion

7. Claim 3 is allowed. Claims 14, 17, 24-28 are withdrawn from consideration and are drawn to a non-elected invention as per the requirement for restriction election. Claims 6-12, 23 are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David K. O'Dell whose telephone number is (571) 272-9071. The examiner can normally be reached on Mon-Fri 7:30 A.M.-5:00 P.M EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Primary examiner, Rita Desai can be reached on (571)272-0684. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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R Desai 9/6/07

D.K.O.

RITA DESAI
PRIMARY EXAMINER